Technical training.
Product information.

F48 Passive Safety Systems

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General information

Symbols used

The following symbol is used in this document to facilitate better comprehension or to draw attention to very important information:

Contains important safety information and information that needs to be observed strictly in order to guarantee the smooth operation of the system.

Information status and national-market versions

BMW Group vehicles meet the requirements of the highest safety and quality standards. Changes in requirements for environmental protection, customer benefits and design render necessary continuous development of systems and components. Consequently, there may be discrepancies between the contents of this document and the vehicles available in the training course.

This document basically relates to the European version of left-hand drive vehicles. Some operating elements or components are arranged differently in right-hand drive vehicles than shown in the graphics in this document. Further differences may arise as a result of the equipment specification in specific markets or countries.

Additional sources of information

Further information on the individual topics can be found in the following:

- Owner's Handbook
- Integrated Service Technical Application.

Contact: conceptinfo@bmw.de

The information contained in this document forms an integral part of the technical training of the BMW Group and is intended for the trainer and participants in the seminar. Refer to the latest relevant information systems of the BMW Group for any changes/additions to the technical data.

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1. Introduction

1.1. The hidden protector

The passive safety system of the F48 is based on the objectives and characteristics of current BMW models. The passive safety system fulfils all legislative requirements worldwide.

The restraint systems ensure that the risk of injury is reduced.

The 4th generation Advanced Crash Safety Module (ACSM) is used as the central airbag control unit for the passive safety system in the F48. In comparison to other current series, with the passive safety system of the F48 the central sensor system is integrated in the ACSM control unit and not in the Integrated Chassis Management (ICM). This is possible with the F48 as the ACSM is located in the center of vehicle.

The ACSM4 of the F48 is connected to the FlexRay instead of previously in the PT-CAN. The sensor data of the central sensor system, which was previously provided by the ICM, can be transmitted directly by the ACSM via FlexRay to the DSC. The DSC processes the sensor data and makes it available to other bus users.

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2. System Overview

2.1. System wiring diagrams

The following bus overview shows an overview of the vehicle circuit structure of the F48 and incorporation of the ACSM in the Flexray.

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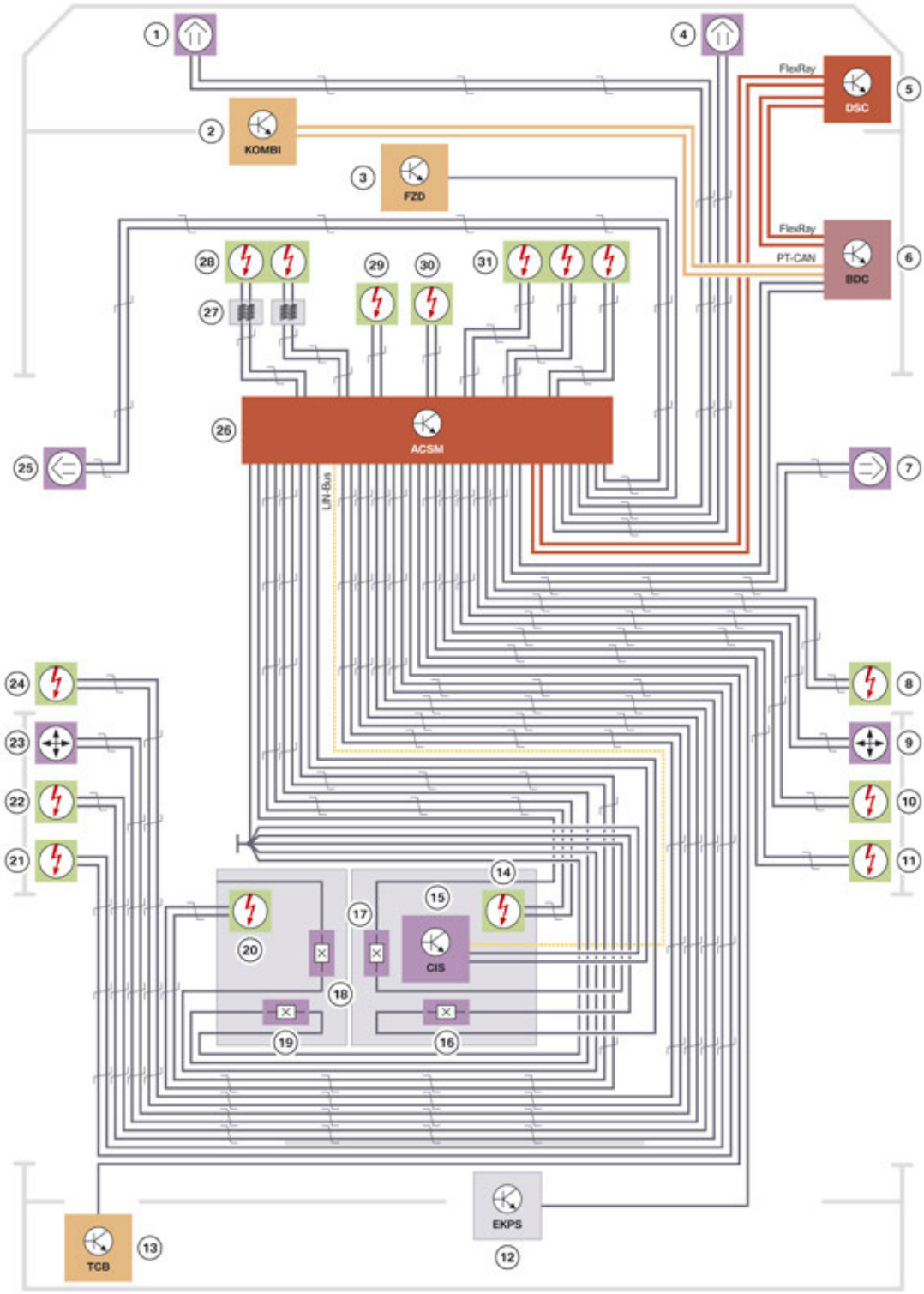
2. System Overview

2.1.1. System wiring diagram for US version



F48 system wiring diagram for passive safety in US-version vehicles

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2. System Overview

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1	Airbag front sensor, left
2	Instrument cluster (KOMBI)
3	Indicator lamp for front passenger airbag deactivation in roof function center
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5	Dynamic Stability Control (DSC)
6	Body Domain Controller (BDC)
7	Airbag sensor, door, right (pressure)
8	Head airbag, passenger's side
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10	Adaptive belt force limiter, passenger's side
11	Side airbag, passenger's side
12	Electronic fuel pump control (EKPS)
13	Telematic Communication Box (TCB)
14	Belt tensioner, passenger 's side
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16	Seat-position sensor, passenger's side
17	Seat belt buckle contact, passenger's side
18	Seat belt buckle contact, driver's side
19	Seat-position sensor, driver's side
20	Belt tensioner, driver's side
21	Side airbag, driver's side
22	Adaptive belt force limiter, driver's side
23	Acceleration sensor, B-pillar, left
24	Head airbag, driver's side
25	Airbag sensor, door, left (pressure)
26	Advanced Crash Safety Module (ACSM)
27	Clock spring
28	Driver's airbag, two-stage
29	Knee airbag, driver's side
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31	Front passenger airbag, two-stage with active vent valve

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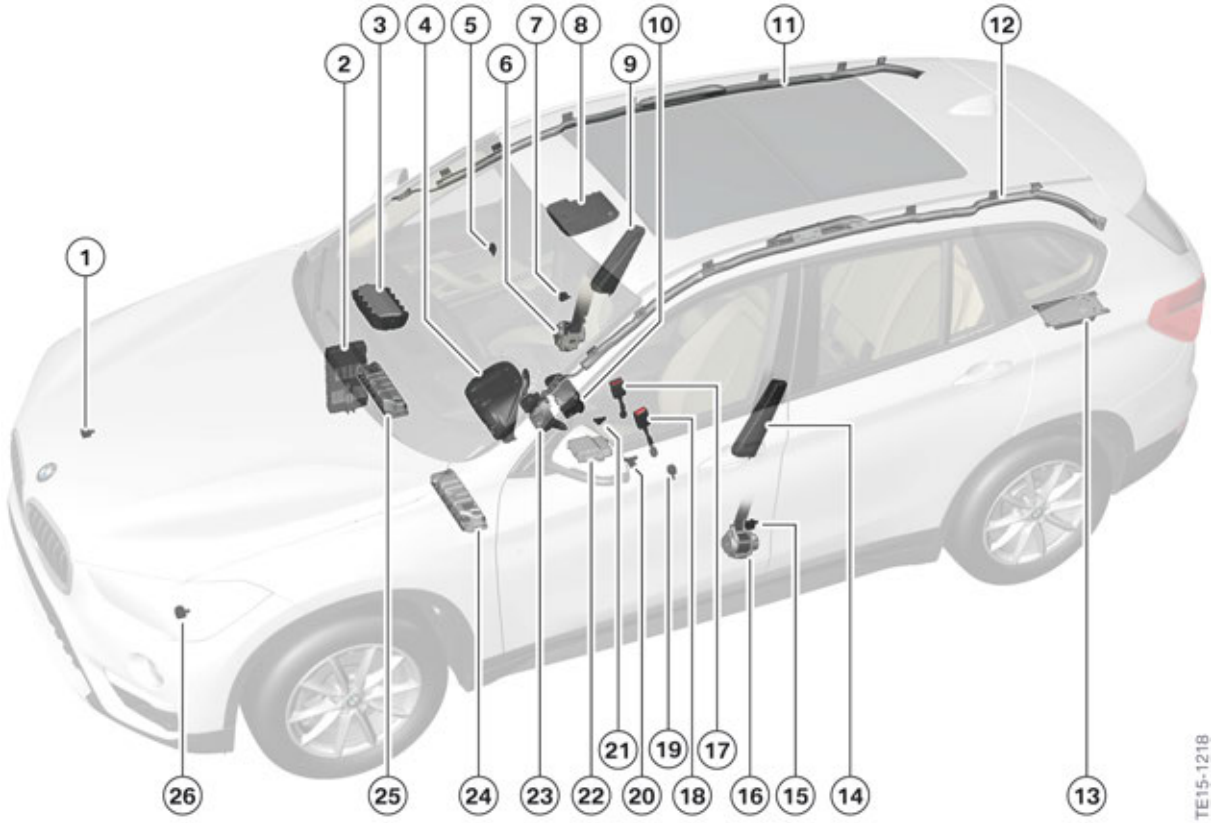
2. System Overview

2.2. System overview of US version



F48 System overview for US-version vehicles

Index	Explanation
1	Airbag front sensor, right
2	Body Domain Controller (BDC)
3	Front passenger airbag, two-stage with active vent valve
4	Airbag sensor, door, right (pressure)
5	Instrument cluster (KOMBI)
6	Belt tensioner and adaptive belt force limiter, passenger's side
7	Indicator lamp for front passenger airbag deactivation in roof function center
8	Acceleration sensor, B-pillar, right
9	Driver's airbag, two-stage
10	Side airbag, passenger's side
11	Head airbag, passenger's side
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13	Telematic Communication Box (TCB)
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21	Airbag sensor, door, left (pressure)
22	Advanced Crash Safety Module (ACSM)
23	Clock spring in the steering column switch cluster
24	Knee airbag, driver's side
25	Knee airbag, passenger's side
26	Airbag front sensor, left

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3. Functions

3.1. Functions of Advanced Crash Safety Module

The function of the Advanced Crash Safety Module is to permanently evaluate all sensor signals in order to identify a crash situation. As a result of the sensor signals and their evaluation, the Advanced Crash Safety Module identifies the direction and the severity of the crash.

The ACSM evaluates the information from the sensors and then forwards corresponding measures for selective activation of the necessary restraint systems.

The Advanced Crash Safety Module monitors the system itself and indicates when it is ready for operation by switching off the airbag indicator light.

If an error occurs during operation this is stored in a fault memory and can be read out for diagnosis purposes.

If a crash situation is detected, a crash message is sent to the other bus users in the data bus network as notification. The relevant control units respond to this signal by executing their own activities according to the severity of the crash.

The activities include:

- Opening the central locking system
- Activating the hazard warning light
- Switching on the interior light
- Making an emergency call

An additional function of the Advanced Crash Safety Module is the acoustic seat belt warning that reminds the driver and front passenger using visual and acoustic signals to fasten their seat belts. Seat belt buckle switches are used to identify whether the driver and/or the front passenger have their seat belts fastened. Information on occupancy of the front passenger seat is also included for the acoustic seat belt warning. Furthermore, for vehicles in the US version the position of the driver and the front passenger seat is monitored.

The functions of the Advanced Crash Safety Module generally belong to one of the following areas:

- Crash-relevant functions
- System monitoring functions
- Additional convenience functions

F48 Passive Safety Systems
3. Functions

3.2. Crash-relevant functions

The Advanced Crash Safety Module must fulfil the following crash-relevant functions:

- Evaluating the sensor signals
- Impact detection
- Determining actuators to be activated
- Specifying the trigger time and trigger sequence
- Activation of the ignition circuit output stages
- Sending the crash message to all bus users
- Crash documentation
- Emergency call function

3.2.1. Evaluating the sensor signals

The sensors serve to identify and verify front-end, side-on and rear-end crashes and also as roll-over detection.

The sensors are located in the ACSM or are directly connected to the Advanced Crash Safety Module where their signals are evaluated and processed.

3.2.2. Impact detection for US version of vehicles

The US version of the vehicles is equipped with the following sensors:

- one lateral and one longitudinal acceleration sensor in the B-pillars (green)
- one airbag sensor to monitor the pressure in each of the front doors (blue)
- one lateral and one longitudinal acceleration sensor in the ACSM (yellow)
- one yaw rate sensor in the ACSM (yellow)
- one vertical acceleration sensor in the ACSM (yellow)
- one airbag front sensor beside the headlights (red)

The airbag front sensors assist with the identification of a head-on crash and its corresponding severity.

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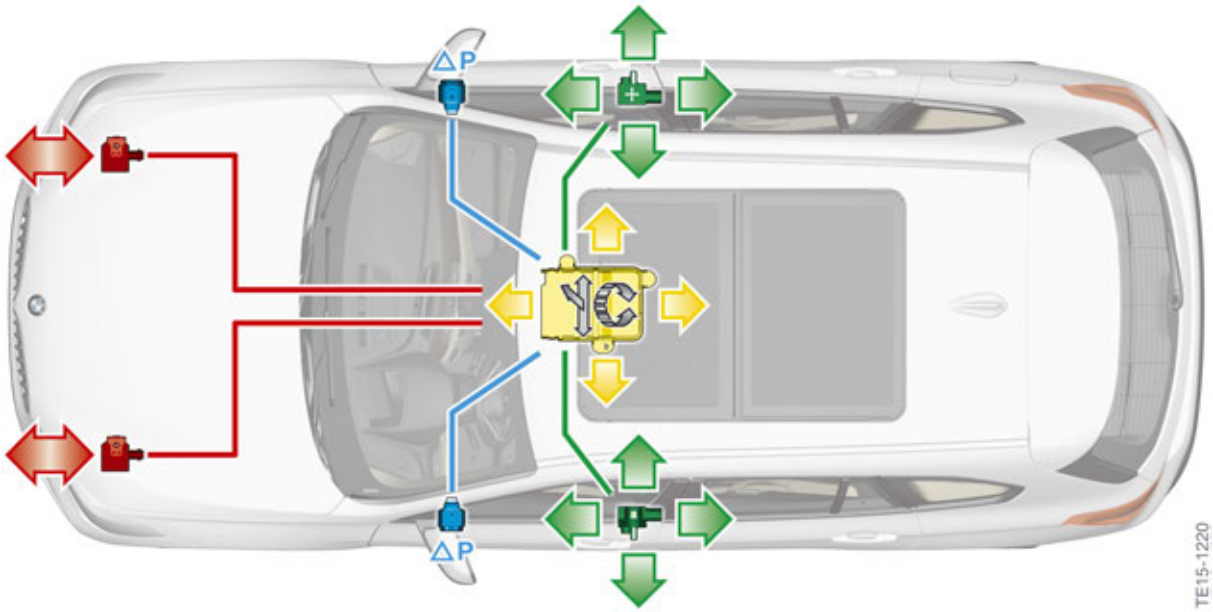
3. Functions



F48 Sensors in US version of vehicles

3.2.3. Trigger time and trigger sequence

The Advanced Crash Safety Module uses the values transmitted by the sensors to determine the direction and severity of the crash.

In the case of a head-on crash, for example, corresponding high acceleration values from the longitudinal acceleration sensors in the rear doors and ACSM respectively must be detected. An algorithm determines the severity and direction of the crash based on the accelerations. This information is used to assist calculation of the trigger times and sequence in which the restraint systems are activated.

A possible imminent rollover is also detected and the appropriate protection systems are activated.

3.2.4. Activation of the ignition circuit output stages

The Advanced Crash Safety Module is supplied in the BDC with terminal 30B. The Advanced Crash Safety Module is in offline mode with terminal 30B. This means that it is active on the data bus and can perform all diagnostic functions. Activation of the ignition circuits is blocked and is only enabled as of terminal 15 once the system self-test is complete. The Advanced Crash Safety Module is also ready for ignition, even with the logical terminal R.

The ignition capacitors are recharged via a switching controller. These ignition capacitors make the firing energy available in the event of a crash. If the voltage supply is interrupted during a crash, the ignition capacitors serve briefly as an energy storage device.

The ignition circuit output stages consist of a high-side and a low-side power switch. The high-side power switch connects the ignition voltage, while the low-side power switch connects to the ground. The ignition circuit output stages are controlled by a microcontroller.

The high-side and low-side power switches also serve to check the ignition circuits during the system self-test.

3.2.5. Sending the crash message

In the event of a collision involving activation of the restraint systems, the Advanced Crash Safety Module sends a crash message to the bus users in the data bus network.

The activation of the Telematic Communication Box is connected parallel via a direct single-wire connection.

As a result, the respective control units perform the following functions depending on the crash severity:

Function	Control unit
Switch off electric fuel pump	Digital Motor Electronics (DME) or via electronic fuel pump control (EKPS)
Release central locking system	Body Domain Controller (BDC)
Switch on hazard warning lights	Body Domain Controller (BDC)
Switch on interior light	Body Domain Controller (BDC)
Make emergency call	Telematic Communication Box (TCB)

3.2.6. Crash documentation

In the event of a collision where one or more actuators are activated, a crash entry is stored in a non-erasable memory. After five crash entries, a non-erasable fault entry is stored together with the information that the five crash messages have been saved. The airbag indicator light also lights up continuously.

The five crash entries could also be stored during the course of an accident. Each crash entry is assigned a system time. The control unit remains ignitable even after five crash entries. The crash entries cannot be erased and serve the purpose of subsequent device diagnosis. A maximum of five crash entries can be saved. The control unit must then be replaced.

3.2.7. Emergency call function

The emergency call functions are country-specific and are available to customers in countries with ConnectedDrive Services infrastructure. A prerequisite for an emergency call is an active SIM card in the Telematic Communication Box and the availability of a mobile phone network.

The emergency call button is connected directly to the Telematic Communication Box.

The manual emergency call allows the driver to request assistance in the event of a medical emergency.

The functions of the emergency call have been modified with the realignment of the ConnectedDrive Services. The next chapters provide detailed information on which functions the F48 receives with Intelligent eCall (SA 6AC).

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3. Functions

3.2.8. Vehicles with Intelligent eCall

The Intelligent eCall (SA 6AC) always includes the option of a manual or automatic emergency call (voice call and data transmission). A voice contact is initiated and data, such as the current position, is transmitted. The emergency call is made to a BMW Call Center or an emergency coordination center, depending on the national-market version.

The Advanced Crash Safety Module sends a message to the Telematic Communication Box in the event of an accident with corresponding crash severity. The Telematic Communication Box makes an emergency call.

With this automatic emergency call, the presumed number of people in the vehicle and sensor data, among other things, are transmitted to the BMW Call Center, in order to identify the severity of the crash.

The information about the accident available at the call center can be forwarded to the emergency coordination center. The emergency coordination center can then initiate appropriate measures.

Attempts are made at the same time to establish a voice contact with the occupants of the vehicle in order to obtain more detailed verbal information about the accident (e.g. condition of occupants).

The following tables provides information on which functions are available in the case of an emergency call with Intelligent eCall :

Equipment	Manual emergency call	Automatic emergency call
Intelligent eCall (SA 6AC)	• Voice call (BMW Call Center) • Data transfer (location).	• Voice call (BMW Call Center) • Data transfer (location) • Sensor data transmission.

If, for various reasons, a connection to the BMW Call Center cannot be established, the emergency call is automatically forwarded to the emergency coordination center.

3.3. System monitoring functions

The Advanced Crash Safety Module has the following system monitoring functions:

- System self-test (pre-drive check)
- Display of system operability
- Cyclic monitoring
- Fault display and fault storage
- Output of faults (diagnosis)
- Acoustic and visual seat belt warning
- Deactivation of the front passenger airbag, side airbag and knee airbag on the passenger's side and the knee airbag in the US version of the vehicles.

F48 Passive Safety Systems

3. Functions

3.3.1. System self test

The Advanced Crash Safety Module performs a system self test from terminal 15. The airbag indicator light is activated for roughly five seconds during the system self test.

Once the system self test is complete and no faults have been identified, the airbag indicator light goes out and the system is ready to operate.

3.3.2. Display of system operability

The airbag indicator light in the instrument cluster goes out to indicate that the Advanced Crash Safety Module (ACSM) is ready for operation.

3.3.3. Cyclic monitoring

Once the system self-test has been successfully concluded and the system is ready for operation, a cyclic monitoring procedure is performed for fault monitoring purposes. This cyclical monitoring serves the internal diagnosis of the control unit and overall airbag system. Cyclical monitoring takes place continuously from terminal 15. It is also continued when the logical terminal R is reached.

3.3.4. Fault display and fault storage

The Advanced Crash Safety Module has a non-volatile fault memory. The airbag indicator light lights up to indicate a fault entry.

Events, such as the activation of an airbag or belt tensioner, are also stored in the fault memory.

If the fault memory contains the entry that the restraint system has been activated, this only means the ignited restraint system is not available for further activation and not that it malfunctioned during the crash.

3.3.5. Output of faults (diagnosis)

The fault memory can be read out via the diagnostic interface with the assistance of the Integrated Service Technical Application (ISTA) in the BMW diagnosis system. After rectifying the faults or after renewing activated components, the fault memory can be cleared with the diagnosis command "Clear fault memory".

3.3.6. Acoustic and visual seat belt warning

An acoustic and visual seat belt warning is a standard feature of all vehicles equipped with the Advanced Crash Safety Module. The Advanced Crash Safety Module records whether or not the driver or front passenger have fastened their seat belts. If they have not, an acoustic and visual warning is output to remind them to fasten their seatbelts. Both seat belt buckle switches are monitored separately.

F48 Passive Safety Systems

3. Functions

3.3.7. Deactivating the airbag

Provision is made in US versions of the vehicles for the airbag to be deactivated automatically in order to satisfy the regulations of the National Highway Traffic Safety Administration (NHTSA). When the child seats listed in the regulation are occupied by a child this must lead to deactivation of the airbag.

To do so, a seat occupancy mat is used on the front passenger seat for the purpose of occupancy detection and classification of occupants in the front passenger seat. In the F48 a capacitive interior sensing floor mat (CIS floor mat) is used.

The CIS mat is made up of two elements: A sensor wire, which runs parallel to the seat heating in the seat cushion, and an evaluation unit. The CIS mat measures the capacity and ohmic resistance between the sensor wire (anode) and the vehicle ground (cathode) at a frequency of 120 kHz.
The CIS mat determines from the change in capacity and resistance whether the front passenger seat is occupied by an adult or a child in a child seat.

The deactivation of the front passenger airbag, the side airbag and knee airbag on the passenger's side is signalled by the indicator lamp for front passenger airbag deactivation.

The indicator lamp for front passenger airbag deactivation in the roof function center lights up if a child seat with child, for e.g. a child restraint system that has been tested in accordance with the NHTSA regulations and is holding a small child, was detected on the front passenger seat or if the front passenger seat is unoccupied.

F48 Passive Safety Systems

4. System Components

4.1. Advanced Crash Safety Module

The Advanced Crash Safety Module is accommodated in a housing with two sockets.

The wiring harness is connected via one of the sockets. An additional socket is provided for the cockpit wiring harness.

F48 Advanced Crash Safety Module

The ACSM in the F48 is located centrally in the vehicle under the center console between the two front seats.

The central sensor system was able to be integrated in the ACSM thanks to the central position of the ACSM.

4.2. Sensors and switches

The following sensors and switches are installed:

- Lateral and longitudinal acceleration sensors in ACSM
- Yaw rate sensor in the ACSM
- Vertical acceleration sensor in the ACSM
- Lateral and longitudinal acceleration sensors in the B-pillars
- One airbag sensor in each of the front doors for pressure
- One airbag front sensor beside the headlights
- CIS mat with occupant classification
- Seat belt buckle switch
- Seat-position sensor, driver's side
- Seat-position sensor, passenger's side
- Emergency call button

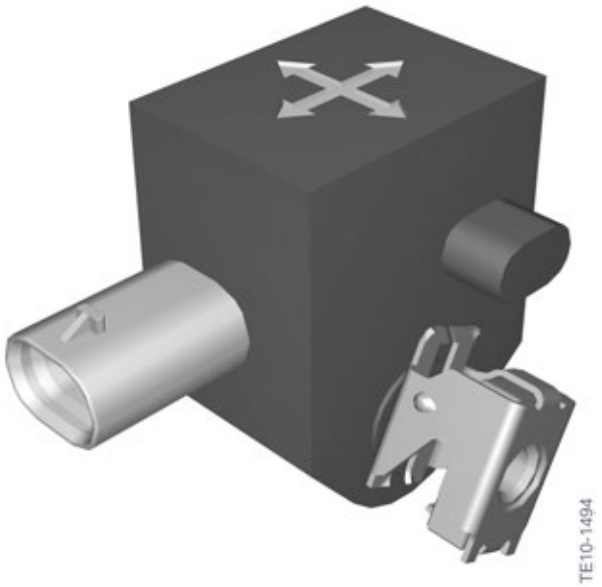
F48 Passive Safety Systems

4. System Components

4.2.1. Lateral and longitudinal acceleration sensor, B-pillar

The lateral and longitudinal acceleration sensors in the B-pillars assist with the identification of front-end crashes, side-on crashes and rear-end crashes.

The B-pillar airbag sensor consists of a longitudinal acceleration sensor and a lateral acceleration sensor. The acceleration sensors measure both the acceleration and the deceleration in the X and Y directions. The resultant from the X and Y signals is decisive in identifying the direction of the crash.



F48 lateral and longitudinal acceleration sensor in the B-pillar

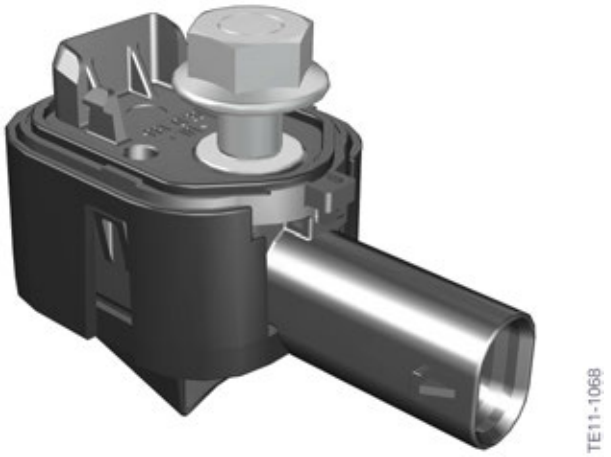
F48 Passive Safety Systems

4. System Components

4.2.2. Door airbag sensor (pressure)

For vehicles in US version, pressure sensors are installed in the driver and front passenger doors. Side-on crashes are identified with the assistance of the airbag sensors. In addition to the lateral acceleration values that are present, the pressure in the door cavity also increases in the event of a side-on crash.

The airbag sensors in the doors serve to verify the plausibility of the acceleration signals from the B-pillar airbag sensors and the ACSM when a side-on crash is detected. The airbag sensors are situated in the inner panel of the doors and measure the pressure increase in the event of a side-on collision. In the event of a side collision with the door, the outer skin is pressed inward, thus reducing the door interior and increasing the inner pressure. This pressure change is measured by the airbag sensors. The airbag sensor also includes electronics, in addition to the pressure sensor, that digitise the pressure readings and transmit them cyclically to the Advanced Crash Safety Module (ACSM). The data transfer is performed by the airbag sensors in the B-pillars. The pressure readings are evaluated in the Advanced Crash Safety Module (ACSM).



F48 Door airbag sensor (pressure)

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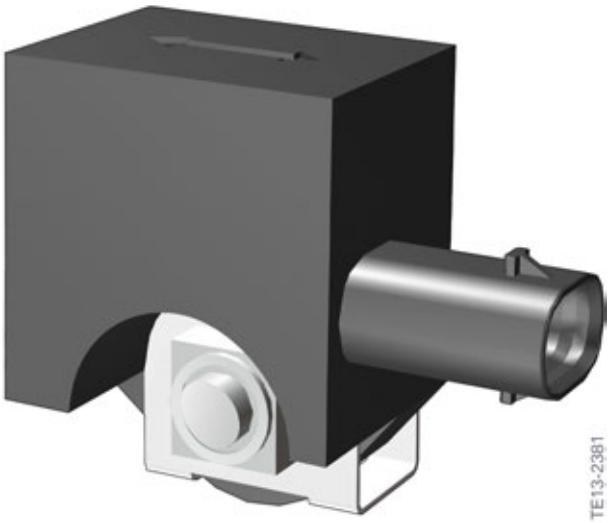
4. System Components

4.2.3. Airbag front sensor

Two airbag front sensors are installed beside the headlights. The measured values are forwarded to the Advanced Crash Safety Module (ACSM) where they are evaluated.

The airbag front sensors on the left and right assist with the identification of a head-on crash.

They deliver additional information to the Advanced Crash Safety Module on the characteristics and severity of the collision. Each sensor contains an acceleration sensor for recording the deceleration, signal processing technology and electronics for data transfer. The measured values are sent in the form of a message to the Advanced Crash Safety Module (ACSM) and are used in the calculation of the algorithm.



F48 airbag front sensor

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4. System Components

4.2.4. Sensors in the ACSM

In the F48, the central sensor system is integrated into the ACSM control unit. The ACSM contains a longitudinal and lateral acceleration sensor, a vertical acceleration sensor and a yaw rate sensor (only US-version vehicles). The ACSM also includes a longitudinal and lateral acceleration sensor and a yaw sensor for the driving dynamics control.

The sensor data for impact detection are evaluated in the ACSM and help identify side-on, rear-end or head-on crashes and assists with roll-over detection. The sensor data not yet evaluated for the driving dynamics control is sent to the DSC control unit via FlexRay, where it is processed.

F48 Advanced Crash Safety Module

4.2.5. CIS mat

In the US version of vehicles, the capacitive interior sensing mat (CIS mat) is fitted in the front passenger seat instead of the seat occupancy mat. The CIS mat can detect whether the front passenger seat is occupied by an adult or a child in a child seat. The deactivation of the front passenger airbag and side airbag and knee airbag on the passenger's side is signalled by the indicator lamp for front passenger airbag deactivation.

F48 Passive Safety Systems

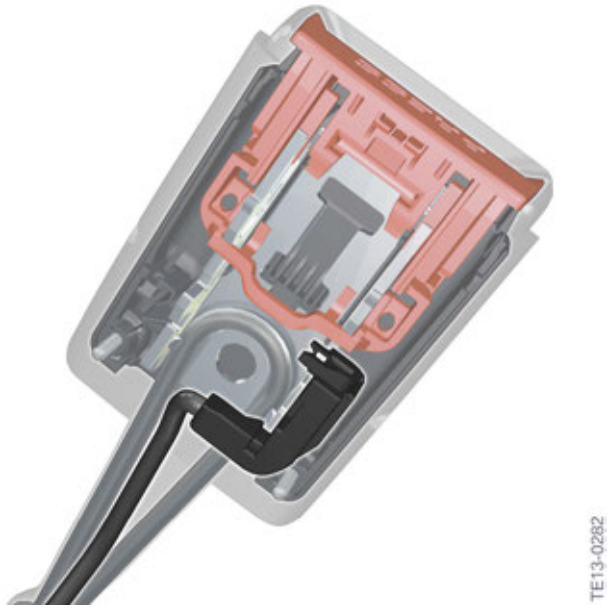
4. System Components

4.2.6. Seat belt buckle switch

The seat belt buckle switches are located in the seat belt buckles of the driver and front passenger seat.

The seat belt buckle switch detects whether the seat belt buckle tongue is in the seat belt buckle. The Advanced Crash Safety Module supplies power to the sensors and performs the evaluation.

From terminal 15, the seat belt buckle switch is permanently monitored and used for the visual and acoustic seat belt warning and also to determine which restraint systems are triggered.



F48 Seat belt buckle switch

4.2.7. Emergency call button

The emergency call button is located in the roof function center.

F48 roof function center with emergency call button in European version

4.2.8. Seat-position sensors

In accordance with the US legal requirement (FMVSS208), a height identification for the person in the driver and front passenger seat must be assessed. This height identification is performed via the adjustment travel of the forward/back seat adjustment. In US-version vehicles, the exact position is identified using the seat-position sensors for the driver and front passenger seats.

The job of the seat-position detector is to distinguish between a relatively small person and a person of normal height within the lengthways adjustment range of the seat. This detection is another technical feature aimed at increasing the safety of the occupants. The deployment of the three airbag stages is then adjusted to the driver's/front passenger's seat position.

The seat-position detector takes the form of a 2-wire hall effect sensor and is supplied with power via the ACSM control unit. The current level of the seat-position sensor changes depending on the seat position.

4.3. Actuators

4.3.1. Overview

The following actuators are installed in the F48:

- Two-stage driver's airbag
- Two-stage driver's airbag with active vent valve
- Knee airbag on front left and right
- Head airbag on left and right
- Side airbag on front left and right
- Belt tensioner with adaptive force limiter

In addition, the following indicator lights inform the vehicle occupants about the condition of the safety systems:

- Airbag indicator light
- Seat belt warning light
- Indicator lamp for front passenger airbag deactivation

The familiar three-point seat belts are used as the seat belt systems for all seats in the F48.

F48 Passive Safety Systems

4. System Components

4.3.2. Driver's airbag

The purpose of the driver's airbag is to reduce the risk of injury to the driver in combination with the seat belt when a front-end crash occurs. The driver's airbag is located in the steering wheel impact plate. The driver's airbag is equipped with a gas generator.

A two-stage gas generator is installed in the US-version of vehicles, which can be used to activate the stages at short or long time differences, depending on the severity of the crash detected and taking into consideration the seat position.

F48 Driver's airbag in US version of vehicles

Index	Explanation
1	Ignition squib, level 1
2	Ignition squib, level 2

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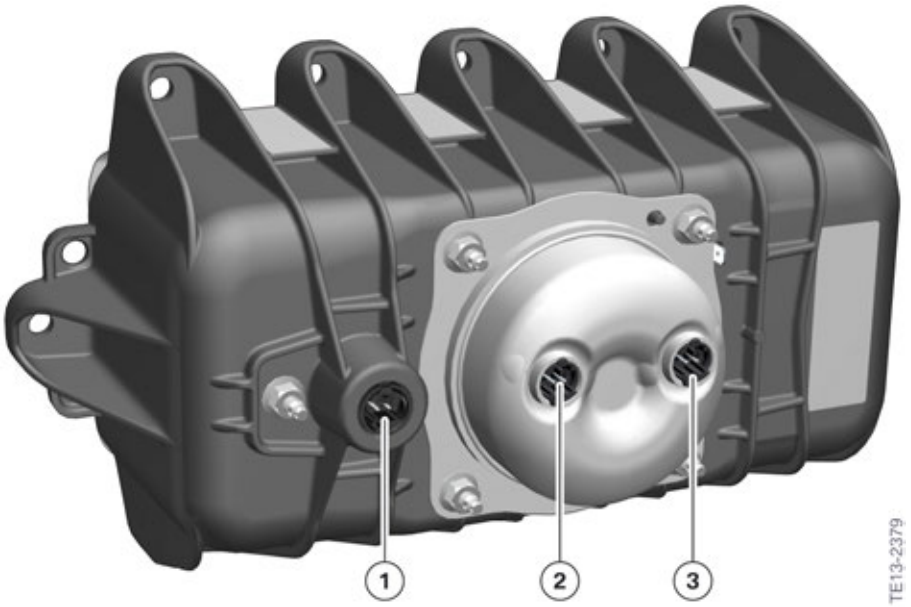
4. System Components

4.3.3. Front passenger airbag

The purpose of the front passenger airbag is to reduce the risk of injury to the front passenger in the event of a front-end crash. The front passenger airbag is located in the instrument panel. When the front passenger airbag expands, the instrument panel tears open at defined points.

A two-stage gas generator is installed in the US-version of vehicles, which can be used to activate the stages at short or long time differences, depending on the severity of the crash detected and taking into consideration the seat position.

Furthermore, the front passenger airbag in the US version of the vehicles features an active vent valve.



F48 Front passenger airbag in US version of vehicles

Index	Explanation
1	Ignition squib for active vent valve
2	Ignition squib, level 1
3	Ignition squib, level 2

F48 Passive Safety Systems

4. System Components

4.3.4. Knee airbag

The US standards (laws) contain requirements on the passive restraint of occupants (without seatbelt). This is why in the US version of the vehicles a knee airbag is also required on the driver's side and passenger's side to control the forwards displacement of the occupant(s) in the event of a head-on crash.

F48 Knee airbag in US version of vehicles

F48 Passive Safety Systems

4. System Components

4.3.5. Head airbag

Head airbags are installed in the F48 to protect the occupants' heads in the event of a side collision.

The head airbag extends from the A-pillar to the C-pillar and covers the entire area of the side windows. It expands between the occupants and side structure.

System features:

- Extended covered area across all front and rear side windows.
- Protection of occupants from glass splinters.
- Covered area for different-sized occupants optimized.

F48 Head airbag

F48 Passive Safety Systems

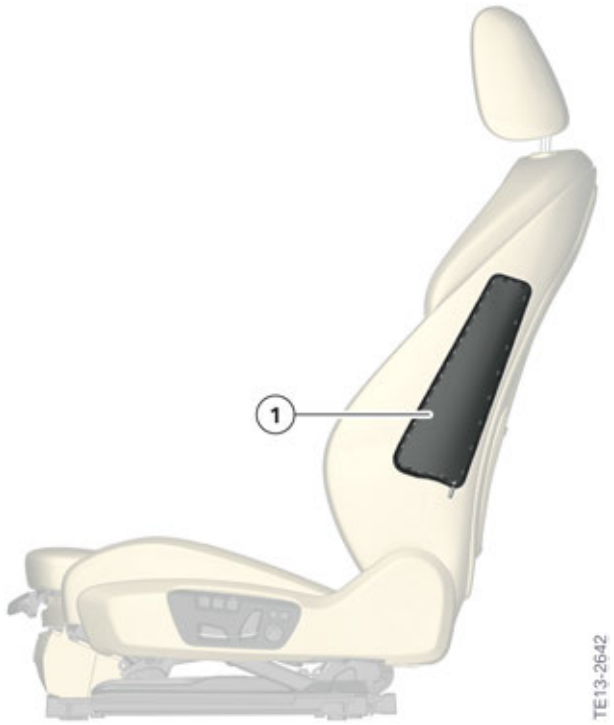
4. System Components

4.3.6. Side airbag

As with all current BMW models, the side airbag at the front ignites out of the front seat backrest.

The side airbags and gas generators are located in a plastic housing, airbag module.
This is installed in the front seat backrest and is concealed by the seat cover.

If activated, the side airbag emerges outwards from the backrest frame and spreads between the side structure and occupant.



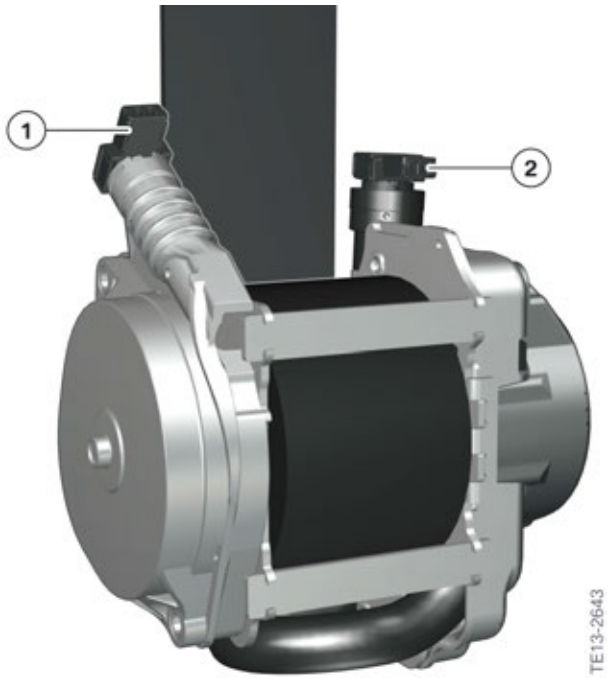
F48 Seat with side airbag

Index	Explanation
1	Side airbag

F48 Passive Safety Systems

4. System Components

4.3.7. Belt tensioner with adaptive force limiter



F48 Belt tensioner with adaptive force limiter

Index	Explanation
1	Connection of ignition squib, belt tensioner
2	Connection of ignition squib, adaptive force limiter

A belt tensioner with adaptive force limiter for the driver and front passenger is built into the US version of the vehicles. The gas generator-assisted belt tensioner ensures that the seat belt strap is reeled in to reduce belt slack prior to forwards displacement of the occupants.

The adaptive force limiter switches from a high level force to a low level force depending on the position of the seat with the assistance of a gas generator in order to reduce the retaining force of the seat belt during the crash depending on the size of the occupant. The further forward the seat is, the earlier the changeover takes place.

When optimally harmonised with the airbag, it ensures the kinetic energy acting on the occupants is more evenly dissipated for the duration of the head-on collision. Thus lower occupant stress values are achieved.

F48 Passive Safety Systems

4. System Components

4.3.8. Airbag indicator light

The airbag indicator light is located on the instrument cluster. The airbag indicator light lights up then goes out during the pre-drive check to signal readiness of the Advanced Crash Safety Module and passive safety systems. The airbag indicator light is controlled via a message on the FlexRay from the Advanced Crash Safety Module via the Body Domain Controller (BDC) to the instrument cluster.
The instrument cluster receives a message cyclically. If the message remains off, the airbag indicator light is activated.

F48 Airbag indicator light

4.3.9. Seat belt warning light

A visual and audible warning is issued if the seat belt is not fastened or is unbuckled during the journey.

F48 Seat belt warning light

The status of the seat belt contacts in the seat belt is visible for a short period in the instrument cluster TFT display during starting
or if a contact is changed.

4.3.10. Indicator lamp for front passenger airbag deactivation

The indicator light for the front passenger airbag deactivation is located in the roof function center. It is automatically activated if the CIS floor mat detects a small child in a child seat or if the front passenger seat is not occupied.

The brightness of the indicator lamp for front passenger airbag deactivation is controlled via the automatic brightness control of the display illumination.

F48 roof function center with indicator lamp for front passenger airbag deactivation in US version

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